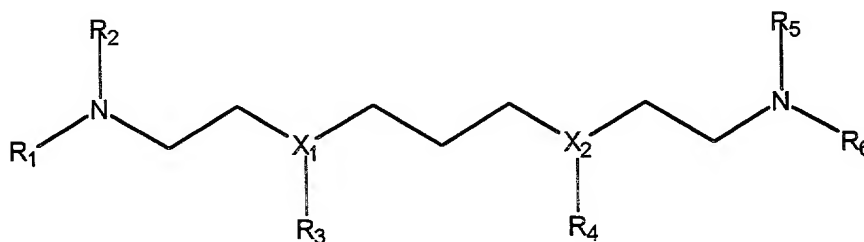


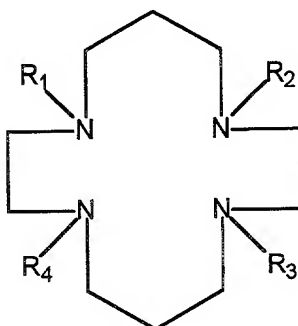
## ABSTRACT

The invention relates to the preparation of novel therapeutically active polyamines, such as derivatives of 1,3-bis-[(2'-aminoethyl)-amino]propane (2,3,2-tetramine) and 1,4,8,11-tetraazacyclotetradecane (cyclam), optimization of their mechanistic and bioavailability characteristics, so these compounds can be used in the treatment of Parkinson's disease, Alzheimer's disease, Lou Gehrig's disease, Binswanger's disease, Olivopontine Cerebellar Degeneration, Lewy Body disease, Diabetes, Stroke, Atherosclerosis, Myocardial Ischemia, Cardiomyopathy, Nephropathy, Ischemia, Glaucoma, Presbycusis, Inherited Mitochondrial Neuropathies and Myopathies and Cancer.

Accordingly, in one aspect the invention is directed to compounds of the formula:



or



wherein

5 R<sub>1</sub> and R<sub>2</sub> may be the same or different and are hydrogen, alkyl, aryl, cycloalkyl, amino acid, glutathione, uric acid, ascorbic acid, taurine, estrogen, dehydroepiandrosterone, probucol, vitamin E, hydroxytoluene, carvidilol, α-lipoic acid, α-tocopherol, ubiquinone, phyloquinone, β-carotene, meanadione, glutamate, succinate, acetyl-L-carnitine, co-enzyme Q, lazeroids, polyphenolic flavonoids, homocysteine, menaquinone, idebenone, dantrolene – (CH<sub>2</sub>)<sub>n</sub>[XCH<sub>2</sub>]<sub>n</sub>NH<sub>2</sub> - wherein n = 3-6 and X = nitrogen, sulfur, phosphorous or carbon, or heterocycle wherein R<sub>1</sub> and R<sub>2</sub> taken together are –(CH<sub>2</sub>XCH<sub>2</sub>)<sub>n</sub>- wherein n = 3-6 and X = nitrogen, sulfur, phosphorous or carbon.

10 R<sub>3</sub> and R<sub>4</sub> may be the same or different and are hydrogen, alkyl, aryl, cycloalkyl, amino acid, glutathione, uric acid, ascorbic acid, taurine, estrogen, dehydroepiandrosterone, probucol, vitamin E, hydroxytoluene, carvidilol, α-lipoic acid, α-tocopherol, ubiquinone, phyloquinone, β-carotene, meanadione, glutamate, succinate, acetyl-L-carnitine, co-enzyme Q, lazeroids, polyphenolic flavonoids, homocysteine, menaquinone, idebenone, dantrolene or heterocycle wherein R<sub>3</sub> and R<sub>4</sub> taken together are –(CH<sub>2</sub>XCH<sub>2</sub>)<sub>n</sub>- wherein n = 3-6 and X = nitrogen, sulfur, phosphorous or carbon.

15 R<sub>5</sub> and R<sub>6</sub> may be the same or different and are hydrogen, alkyl, aryl, cycloalkyl, amino acid, glutathione, uric acid, ascorbic acid, taurine, estrogen, dehydroepiandrosterone, probucol, vitamin E, hydroxytoluene, carvidilol, α-lipoic acid, α-tocopherol, ubiquinone, phyloquinone, β-carotene, meanadione, glutamate, succinate, acetyl-L-carnitine, co-enzyme Q, lazeroids, polyphenolic flavonoids, homocysteine, menaquinone, idebenone, dantrolene – (CH<sub>2</sub>)<sub>n</sub>[XCH<sub>2</sub>]<sub>n</sub>NH<sub>2</sub> - wherein n = 3-6 and X = nitrogen, sulfur, phosphorous or carbon, or

heterocycle wherein  $R_5$  and  $R_6$  taken together are  $-(CH_2XCH_2)_n-$  wherein  $n = 3-6$  and  $X =$  nitrogen, sulfur, phosphorous or carbon.

$M$ ,  $n$ , and  $p$  may be the same or different and are bridging groups of variable length from 3-12 carbons.

$X_1$  and  $X_2$  may be the same or different and are nitrogen, sulfur, phosphorous or carbon.